leyan University, received his Ph.D. in physiology at Chicago in 1902 and his M.D. from Rush Medical College in 1905. Before going to St. Louis he was instructor in physiology in the University of Chicago, and at the Marine Biological Laboratory at Woods Hole.

MRS. MARGRETE BOSE has been appointed professor of chemistry in the University of La Plata. Her husband, Dr. E. Bose, is professor of physics in the university.

MR. JAMES LEES, of the University of Bristol, has been appointed lecturer in engineering in the South African College, Cape Town.

DR. FRANZ HOFMANN, professor of physiology at Innsbruck, has been called to the German University of Prague to succeed Professor Gad.

DISCUSSION AND CORRESPONDENCE

LABORATORY TABLES

TO THE EDITOR OF SCIENCE: Several months ago I read with interest in SCIENCE Professor Augustus H. Gill's suggestions for chemical laboratory furniture and fittings. Among other things he discusses various kinds of materials and surfaces for table tops. It occurs to me that it may be of sufficient interest to warrant calling attention to still another kind of surface for laboratory tables.

In our testing laboratory at The York Manufacturing Company we have tables with tops of ordinary wood. On this there are placed sheets or slabs of heavy asbestos board, one fourth inch thick. These are fastened in place by a few small brads driven around the edge. All around the outer edge of the table there is a narrow strip of wood of the same thickness as the asbestos board, making a permanent border. This, as a matter of course, is nailed in place. It prevents the edges of the asbestos from becoming frayed out. The advantages of this asbestos surface are almost self evident. Flasks and beakers containing hot water or solutions can be stood upon it without fear of their cracking. There is also little risk of breaking glassware by setting it down a little too hard, as is often the case on slate or stone or even wood, where particles of grit may happen to be. And of course the resistance of the asbestos to fire and heat is too well known to need any comment. There is the further advantage that when the asbestos slab becomes old and worn it is easily replaced without in any way disturbing the table, thus making the latter practically new.

We have found this plan highly satisfactory and pass on the suggestion for any who may desire to try it. It is quite possible that it is an old device after all.

C. H. EHRENFELD

YORK, PA.

A FORMULA FOR OPTICAL INSTRUMENTS

IN many surveying and optical instruments a ray of light is reflected by a pair of plane mirrors. And if ϕ be the angle between said mirrors; and the entering light ray lies in the plane commonly perpendicular to them; then, of course, the doubly reflected ray must cross its original path at the angle 2ϕ. And, although the ray sway from side to side; so long as it preserves its parallel position to this commonly perpendicular plane; so long also is the crossing angle still 2ϕ.

But now, should the entering ray be deflected at a variable angle θ to this commonly perpendicular plane, then the question arises as to the resultant effect upon the crossing angle, a problem that constantly arises in practise, and yet one, I believe, that the textbooks leave unanswered.

The single solution is as follows: letting ϕ be the angle between the two mirrors, and θ be the independent variable angle that the entering light ray makes with the plane commonly perpendicular to the said mirrors, while δ is the crossing angle desired. Then,

$$(\cos\theta)\ (\sin\phi) = \sin\tfrac{1}{2}\delta,$$

a very simple formula, that can be easily demonstrated by elementary trigonometry.

In the special cases where the entering ray is normally inclined to the commonly perpendicular plane, and it be asked what errors may be produced by changes in the direction of that ray? we should simply determine, first, the angle ϕ between the two mirrors, and